TOP

SECTION 2

(White)

029344

Routing and Transmittal Slip

Date: 9/18/01

	Initial	Date
___ FROZEN		
1. AAO	[illegible]	9/26/01
2. RETURN: La Shaun P. Phillip	[illegible]	9/18
3. Mailoo	BB	10-3-2001

RLC 9/18

Award/Amendment for ACTION

Assistance **I.D.** Number: CR829344-01-0

01/02

OCT - 3 2001

✓	New Agreement		Partial Funding
	Increase Funding		New Fellowship
	Decrease Funding		Fellowship Increase
	Time Extension w/Money		Other (**Administrative**)
	No-Cost Extension		

From: La Shaun Phillips 564-5348

CI829344-01-0

Attachment A

Minority Business Enterprises (MBE)/Womens' Business Enterprises (WBE) Terms and Conditions for non-SRF Recipients with EPA-approved FY 1998 MBE/WBE Goals that were not based on historical data of dollars awarded to MBEs and WBEs

1. The recipient agrees to comply with the requirements of EPA's Program for Utilization of Small, Minority and Women's Business Enterprises in procurement under assistance agreements.

(a) The recipient accepts the applicable FY 1998 Minority Business Enterprise (MBE)/Womens' Business Enterprise (WBE) "fair share" goals/objectives negotiated with EPA by the State as the FY 1999 MBE/WBE "fair share" goals/objectives as follows:

	MBE	WBE
Construction	6 %	6 %
Supplies	[illegible] %	[illegible] %
Services	[illegible] %	[illegible] %
Equipment	[illegible] %	[illegible] %
	OR	
Combined Rate	____ %	____ %

(b)(1) The recipient agrees to ensure, to the fullest extent possible, that at least the applicable "fair share" objectives of Federal funds for prime contracts or subcontracts for supplies, construction, equipment or services are made available to organizations owned or controlled by socially and economically disadvantaged individuals, women and Historically Black Colleges and Universities.

(2) For assistance agreements related to research under the Clean Air Act Amendments of 1990, the recipient agrees to ensure, to the fullest extent possible, that at least the applicable "fair share" objectives of Federal funds for prime contracts or subcontracts for supplies, construction, equipment or services are made available to organizations owned or controlled by socially and economically disadvantaged individuals, women, disabled Americans, Historically Black Colleges and Universities, Colleges and Universities having a student body in which 40% or more of the students are Hispanic, minority institutions having a minority student body of 50% or more, and private and voluntary organizations controlled by individuals who are socially and economically disadvantaged.

(c) The recipient agrees to include in its bid documents the applicable "fair share" objectives and require all of its prime contractors to include in their bid documents for subcontracts the negotiated "fair share" percentages.

(d) The recipient agrees to follow the six affirmative steps or positive efforts stated in 40 CFR §30.44(b), 40 CFR §31.36(e), or 40 CFR §35.6580, as appropriate, and retain records documenting compliance.

(e) The recipient agrees to submit an EPA form 5700-52A "MBE/WBE Utilization Under Federal Grants, Cooperative Agreements and Interagency Agreements," beginning with the Federal fiscal year quarter the recipient receives the award and continuing until the project is completed. These reports must be submitted to MBE/WBE Coordinator, Lupe Saldana, U.S. Environmental Protection Agency, 401 M Street, SW, Mail Code 3903R, Room 5128, Washington, D.C. 20460, 202-564-5353, within 30 days of the end of the Federal fiscal quarter (January 30, April 30, July 30, and October 30). For assistance awards for continuing environmental programs and assistance awards with institutions of higher education, hospitals and other non-profit organizations, the recipient agrees to submit an EPA form 5700-52A to MBE/WBE Coordinator, Lupe Saldana by October 30 of each year.

(f) If race and/or gender neutral efforts prove inadequate to achieve a "fair share" objective, the recipient agrees to notify EPA in advance of any race and/or gender conscious action it plans to take to more closely achieve the "fair share" objective.

2. EPA may take corrective action under 40 CFR Parts 30, 31, and 35, as appropriate, if the recipient fails to comply with these terms and conditions.

9 EPA participation in the salary rate (excluding overhead) paid to individual consultants is limited to the maximum daily rate for a Level IV of the Executive Schedule, which is currently $431.83

10 In accordance with 40 CFR 31.34 for State, local and Indian Tribal governments or 40 CFR 30.36 for other recipients, EPA has the right to reproduce, publish, use, and authorize others to use copyrighted works developed under this assistance agreement for Federal purposes Examples of Federal purpose include but are not limited to: (1) Use by EPA and other Federal employees for official Government purposes; (2) Use by Federal contractors performing specific tasks for the Government; (3) Publication in EPA documents provided the document does not disclose trade secrets (e g software codes) and the work is properly attributed to the recipient through citation or otherwise; (4) Reproduction of documents for inclusion in Federal depositories; (5) Use by State, tribal and local governments that carry out delegated Federal environmental programs as "co-regulators" or act as official partners with EPA to carry out a national environmental program within their jurisdiction; (6) Limited use by other grantees to carry out Federal grants provided the use is consistent with the terms of EPA's authorization to the grantee to use the copyrighted material

Programmatic Conditions

1 The EPA Project Officer and the Project Manager from Building Performance Incorporated (BPI) will collaborate throughout all phases of the Agreement At a minimum, this collaboration will occur through monthly conference calls and quarterly meetings

2 The EPA Project Officer will monitor the progress of the work throughout the project to ensure overall direction

3 The recipient agrees to submit a reproducible copy of each report or output that is suitable for printing

Administrative Conditions

1. The recipient agrees to comply with the MBE/WBE terms and conditions outlined in Attachment A.

2. The recipient agrees to submit to the EPA Project Officer within 90 days after the expiration or termination of the approved project period a final report and at least one reproducible copy suitable for printing. The final report shall document project activities over the entire project period and shall describe the recipient's achievements with respect to stated project purposes and objectives.

3. In accordance with EPA guidance and OMB Circular No. A-21 or A-122, as appropriate, the recipient agrees that it will not use assistance funds (Federal or non-Federal share) for lobbying or political activities.

4. In accordance with Section 18 of the Lobbying Disclosure Act of 1995, P.L. No. 105-65, 10? Stat. 691, the recipient affirms that:

(1) it is not a nonprofit organization described in Section 501(c)(4) of the Internal Revenue Code of 1986, or

(2) it is a nonprofit organization described in Section 501(c)(4) of the Internal Revenue Code of 1986 but does not and will not engage in lobbying activities as defined in Section 3 of the Lobbying Disclosure Act of 1995.

5. In accordance with 40 CFR 30.24(b)(1), program income will be added to funds committed to the project by EPA and used to further eligible project or program objectives.

6. In accordance with OMB Circular A-21, A-87, or A-122, as appropriate, the recipient agrees that it will not use project funds, including the Federal and non-Federal share, to engage in lobbying the Federal Government or in litigation against the United States. The recipient also agrees to provide the information mandated by EPA's annual appropriations acts for fiscal year 2000 and fiscal year 2001 (P.L. 106-74, §426 and P.L. 106-377, §424 respectively) which require as follows: "A chief executive officer of any entity receiving funds under this Act shall certify that none of these funds have been used to engage in the lobbying of the Federal Government or in litigation against the United States unless authorized under existing law." The recipient may satisfy this certification requirement in any reasonable manner. The certification must be submitted to EPA after all grant funds have been expended.

7. The recipient agrees to submit quarterly progress reports to the EPA Project Officer within thirty days after each reporting period. These reports shall cover work status, work progress, difficulties encountered, preliminary data results and a statement of activity anticipated during the subsequent reporting period, including a description of equipment, techniques, and materials to be used or evaluated. A discussion of expenditures along with a comparison of the percentage of the project completed to the project schedule and an explanation of significant discrepancies shall be included in the report. The report shall also include any changes of key personnel concerned with the project.

8. The recipient's authorized budget includes indirect costs in the amount of $1,643.00". The recipient agrees within 90 days of accepting this assistance agreement/amendment to prepare and maintain on file for review an indirect cost rate proposal based upon the guidance in the enclosed EPA booklet entitled, "Preparing Indirect Cost Rate proposals for Grants and Contracts." If this award is subject to the requirements of OMB Circular A-133, the recipient agrees to include its indirect cost rate proposal as part of its A-133 audit. (see 40 CFR 30.54" or 30.26 as appropriate)

Budget Summary Page

Table A - Object Class Category (Non-construction)	Total Approved Allowable Budget Period Cost
1. Personnel	$7,471
2. Fringe Benefits	$2,391
3. Travel	$7,100
4. Equipment	$0
5. Supplies	$650
6. Contractual	$20,720
7. Construction	$0
8. Other	$0
9. Total Direct Charges	$38,332
10. Indirect Costs: % Base See Terms & Conditions	$1,643
11. Total (Share: Recipient 0.00 % Federal 100.00 %.)	$39,975
12. Total Approved Assistance Amount	$39,975
13. Program Income	$0

EPA Funding Information

FUNDS	FORMER AWARD	THIS ACTION	AMENDED TOTAL
EPA Amount This Action	$	$ 39,975	$ 39,975
EPA In-Kind Amount	$	$	$ 0
Unexpended Prior Year Balance	$	$	$ 0
Other Federal Funds	$	$	$ 0
Recipient Contribution	$	$	$ 0
State Contribution	$	$	$ 0
Local Contribution	$	$	$ 0
Other Contribution	$	$	$ 0
Allowable Project Cost	$ 0	$ 39,975	$ 39,975

Assistance Program (CFDA)	Statutory Authority	Regulatory Authority
66.606 - Surveys - Studies - Investigations - Spec!	Clean Air Act Sec 103	40 CFR PART 30

Fiscal

Site Name	DCN	FY	Approp. Code	Budget Organization	PRC	Object Class	Site/Project	Cost Organization	Obligation / Deobligation
	EC1707	0102	B	58E2	60201A	4183			39,975
									39,975

OFFICIAL FILE COPY
RETURN AFTER SIGNATURE

OFFICIAL FILE COPY
RETURN AFTER SIGNATURE

U.S. ENVIRONMENTAL PROTECTION AGENCY

Cooperative Agreement

ASSISTANCE ID NO.			DATE OF AWARD
PRG	DOC ID	AMEND#	
X -	82934401	- 0	SEP 26 2001
TYPE OF ACTION: New			MAILING DATE: OCT - 3 2001
PAYMENT METHOD: Advance			ACH#

RECIPIENT TYPE:
Non-Profit Organization

Send Payment Request to:
Las Vegas Financial Management Center

RECIPIENT:
Building Performance Institute Inc
126 State Street, Third Floor
Albany, NY 12207
EIN: 14-1789014

PAYEE:
Executive Director
Building Performance Institute Inc
505 Eighth St , Ste 801
New York, NY 10081

PROJECT MANAGER	EPA PROJECT OFFICER	EPA GRANT SPECIALIST
Courtney Moriarta Building Performance Institute Inc 126 State Street, Third Floor Albany, NY 12207 E-Mail: Phone: 518-207-4505	Lena Nirk 1200 Pennsylvania Ave, NW, 6202J Washington, DC 20460 E-Mail: Phone: 202-564-9841	LaShaun Phillips 1200 Pennsylvania Ave, NW Washington, DC 20460, 3903R E-Mail: phillips lashaun@epa.gov Phone: 202-564-5348

PROJECT TITLE AND DESCRIPTION
Building Performance Certification Development-
SMALL GRANT- To develop infrastructure for promotion and delivery of building performance certifications

BUDGET PERIOD	PROJECT PERIOD	TOTAL BUDGET PERIOD COST	TOTAL PROJECT PERIOD COST
10/09/2001 - 10/08/2002	10/09/2001 - 10/08/2002	$39,975.00	$39,975.00

NOTE: The Agreement must be completed in duplicate and the Original returned to the appropriate Grants Management Office listed below, within 3 calendar weeks after receipt or within any extension of time as may be granted by EPA. Receipt of a written refusal or failure to return the properly executed document within the prescribed time, may result in the withdrawal of the offer by the Agency. Any change to the Agreement by the Recipient subsequent to the document being signed by the EPA Award Official, which the Award Official determines to materially alter the Agreement, shall void the Agreement.

OFFER AND ACCEPTANCE

The United States, acting by and through the U.S. Environmental Protection Agency (EPA), hereby offers Assistance/Amendment to the Building Performance Institute Inc for 100.00 % of all approved costs incurred up to and not exceeding $39,975 for the support of approved budget period effort described in application (including all application modifications) cited in the Project Title and Description above, signed 06/18/2001 included herein by reference.

ISSUING OFFICE (GRANTS MANAGEMENT OFFICE)	AWARD APPROVAL OFFICE
ORGANIZATION / ADDRESS	ORGANIZATION / ADDRESS
Grants Administration Division 1200 Pennsylvania Ave, NW 3903R Washington, DC 20460	Office of Air and Radiation OAR 1200 Pennsylvania Ave, NW Washington, DC 20460

THE UNITED STATES OF AMERICA BY THE U.S. ENVIRONMENTAL PROTECTION AGENCY

SIGNATURE OF AWARD OFFICIAL	TYPED NAME AND TITLE	DATE
Patricia L Simon for	Mildred Lee, Chief - Grants Operations Branch A	9/26/01

This agreement is subject to applicable U.S. Environmental Protection Agency statutory provisions and assistance regulations. In accepting this award or amendment and any payments made pursuant thereto, (1) the undersigned represents that he is duly authorized to act on behalf of the recipient organization, and (2) the recipient agrees (a) that the award is subject to the applicable provisions of 40 CFR Chapter 1, Subchapter B and of the provisions of this agreement (and all attachments), and (b) that acceptance of any payments constitutes an agreement by the payee that the amounts, if any found by EPA to have been overpaid will be refunded or credited in full to EPA.

BY AND ON BEHALF OF THE DESIGNATED RECIPIENT ORGANIZATION

SIGNATURE	TYPED NAME AND TITLE	DATE
Courtney Moriarta	COURTNEY MORIARTA, EXECUTIVE DIRECTOR	10/17/01

APP 2/7/02

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF ADMINISTRATION
AND RESOURCES
MANAGEMENT

OCT 3 - 2001

Dear EPA Grant Recipient:

Federal funds have been approved for the project identified on the enclosed assistance agreement or assistance amendment. Please make a copy for your records and provide the appropriate copies within your organization. You must accept this assistance agreement or amendment by **signing** and **returning** it to EPA within three weeks to the following address:

U.S. Environmental Protection Agency
Grants Administration Division
Grants Operations Branch (3903R)
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460

Please note that the above address is EPA's mailing address for normal delivery. If you want to send the agreement/amendment via courier, the following address should be used

U.S. Environmental Protection Agency
Ronald Reagan Building
Grants Administration Division (3903R)
Room 51288 (Mail Room)
1300 Pennsylvania Avenue, N.W.
Washington, D.C. 20004
(202) 564-5305

If the assistance agreement or amendment includes any terms and conditions requiring signed certifications or assurances, you must return them with the agreement or amendment. Payment will not be made until required certifications and assurances are received.

This project is subject to post award monitoring activities such as site visits correspondence and/or telephone calls as appropriate

At the conclusion of this agreement, you are required to submit, within 90 calendar days, all financial, performance and other reports as required by the terms and conditions and applicable EPA regulations (40 CFR 30 or 40 CFR 31). EPA regulations governing this grant may be viewed at www.epa.gov/ogd/grants

If you have any questions, please contact the Grants Specialist identified on the award document

Enclosures

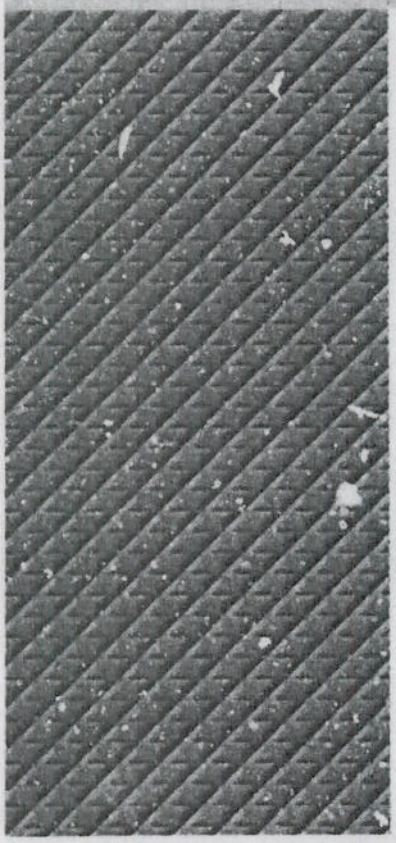
TOP

SECTION 1

(Blue)

Let Mercury Solutions help you realize your vision of what a web presence is all about

mercury solutions



Mercury Solutions provides:

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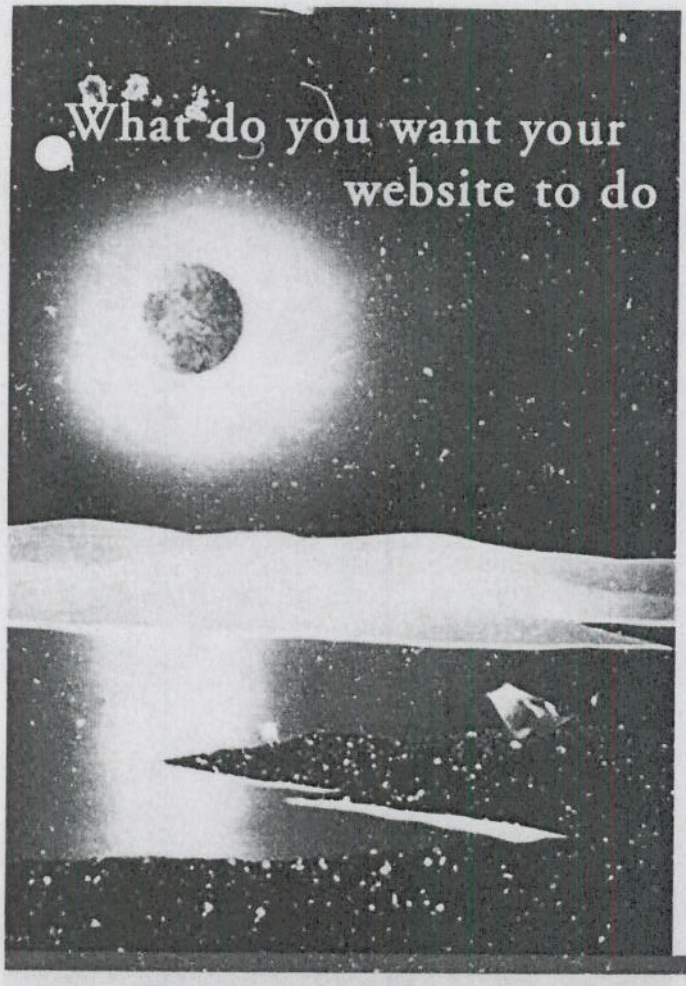
- Creative collaboration
- Website design and programming
- integration of Flash technology
- Streaming Audio/Video
- Database programming and integration
- E-commerce solutions
- Search engine optimization
- Portals
- Web hosting options

We will take the time to learn about your business, evaluate your needs and goals, and discuss your budget. We can then recommend your most effective web site design and marketing options.

All consultations are free and offered without further obligation. Please contact us to arrange an appointment.

518-674-0699
www.mercsolutions.com
po box 3737, albany ny 12203



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Increase profits
Increase profits
Increase profits

Give you the compe itive edge

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518-674-0699

What do you want your website to do for you?

Total Project Cost Worksheet

EPA Contribution

Class Categories	Task 1 Pilot Accreditations	Task 2 Technical Standards Development	Task 3 Field Guide Revision	Task 4 Website Development	Total
Personnel	$ 1,227.00	$ 1,858.00	$ 3,486.00	$ 900.00	$ 7,471.00
Fringe	$ 342.64	$ 594.56	$ 1,115.52	$ 288.00	$ 2,390.72
Travel	$ 2,100.00	$ 5,000.00	$ -	$ -	$ 7,100.00
Equipment	$ -	$ -	$ -	$ -	$ -
Supplies	$ 225.00	$ 175.00	$ 150.00	$ 100.00	$ 650.00
Contractual	$ 2,520.00	$ 15,500.00	$ -	$ 2,700.00	$ 20,720.00
Construction	$ -	$ -	$ -	$ -	$ -
Other	$ -	$ -	$ -	$ -	$ -
Total Direct Charges	**$ 6,464.64**	**$ 23,127.56**	**$ 4,751.52**	**$ 3,988.00**	**$ 38,331.72**
Indirect Charges	$ 269.94	$ 408.76	$ 766.92	$ 198.00	$ 1,643.62
Totals	**$ 6,734.58**	**$ 23,536.32**	**$ 5,518.44**	**$ 4,186.00**	**$ 39,975.34**

Total Project Costs

Class Categories	Task 1	Task 2	Task 3	Task 4	Total
Personnel	$ 2,895.00	$ 5,592.00	$ 7,750.00	$ 1,305.00	$ 17,542.00
Fringe	$ 926.40	$ 1,789.44	$ 2,480.00	$ 417.60	$ 5,613.44
Travel	$ 2,460.00	$ 5,600.00	$ -	$ -	$ 8,060.00
Equipment	$ -	$ -	$ -	$ -	$ -
Supplies	$ 225.00	$ 175.00	$ 150.00	$ 100.00	$ 650.00
Contractual	$ 2,700.00	$ 24,500.00	$ 27,500.00	$ 2,700.00	$ 57,400.00
Construction	$ -	$ -	$ -	$ -	$ -
Other	$ -	$ -	$ -	$ -	$ -
Total Direct Charges	**$ 9,206.40**	**$ 37,656.44**	**$ 37,880.00**	**$ 4,522.60**	**$ 89,265.44**
Indirect Charges	$ 636.90	$ 1,230.24	$ 1,705.00	$ 287.10	$ 3,859.24
Totals	**$ 9,843.30**	**$ 38,886.68**	**$ 39,585.00**	**$ 4,809.70**	**$ 93,124.68**

Funding Source Summary

Funding Source	Task 1	Task 2	Task 3	Task 4	Total
EPA Contribution	$ 6,734.58	$ 23,536.32	$ 5,518.44	$ 4,186.00	$ 39,975.34
INCAA	$ -	$ -	$ 10,000.00	$ -	$ 10,000.00
NYSERDA*	$ 2,000.00	$ 10,000.00	$ 15,000.00	$ -	$ 27,000.00
In Kind	$ 1,108.72	$ 5,350.36	$ 9,066.56	$ 623.70	$ 16,149.34
Totals	**$ 9,843.30**	**$ 38,886.68**	**$ 39,585.00**	**$ 4,809.70**	**$ 93,124.68**

**NYSERDA grant contingent upon EPA award*

ATTACHM[illegible]

Proposed EPA Grant Timelines

Phase I

	July-01				August				September				October			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Task 1	Recruiting for Pilot Accreditations									1st Pilot						
Task 2	Technical Committee Recruiting				1st Meeting				Draft 1 Due	Review Period						
Task 3	Initial Meeting w/ INCAA in May, ongoing revisions														First Draft Review Period	
Task 4	Initiate Sub-Contractor Work					Copy and Materials Assembled for Sub				Development			Website Goes Live			

Phase II

	November				December				Jan-02				February			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Task 1		2nd Pilot								3rd Pilot	QA and Evaluation					
Task 2	(cont.)	Draft 2 Due			2nd Meeting					Final Draft	Final Review Period				Final Document Prep	
Task 3	(cont.)	Final Draft Preparation				Publishing				Printing						
Task 4																

Phase III

	March				April				May				June			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Task 1	QA Eval (cont.)		Final Report and Recommendations						Recruit for second round of pilots in different regions, certify regional proctors							
Task 2	Final Draft Prep (cont.)		Final Document		Publishing and Printing				3rd Meeting	Draft standards for multi-family (or other)						
Task 3																
Task 4																

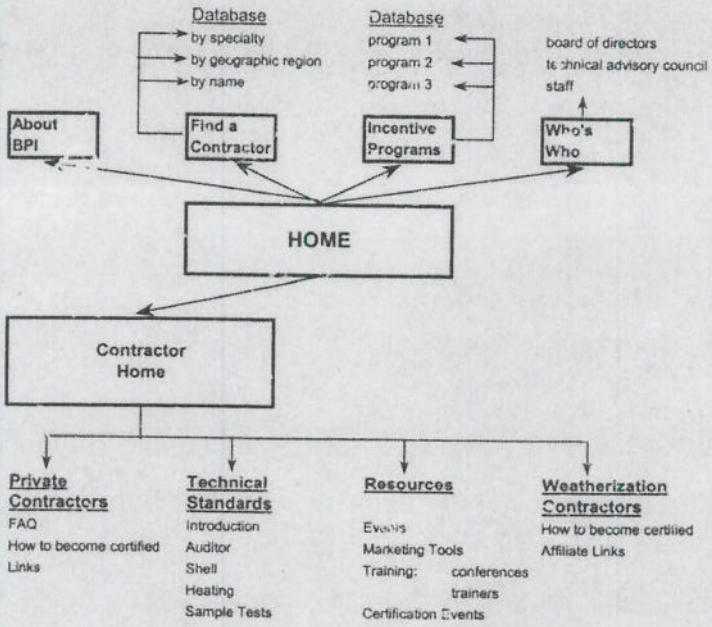
Begin un-funded work.

Phase IV

	July				August				September				October			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Task 1		Pilot 1 -- Regional Proctor Model								Pilot 2 -- Regional Proctor Model						
Task 2	First Draft, multi-family standards		Review period									Final Draft			4th Meeting	
Task 3	Ongoing revision as needed to support additional certifications															
Task 4	Update and expand to support new documents and procedures determined by pilot															

Years 2,3: Continued work to provide certifications in additional technical disciplines.
Technical Standards and Field Guide development for additional climate regions.
Outreach to expand regional access to certification, including establishment of affiliated organizations to deliver certifications locally.

Attachment D



ATTACHMENT C

BPI Field Guide

(see separate document)

Steam Distribution

Steam boilers must be equipped with high pressure limits and low-water cut-off controls. High pressure limit controls must be set at or below 10 psi.

Low-water cut-off flush valves that leak or are inoperable must be repaired or replaced.

Steam vents must be operable and all radiators must receive steam during every cycle. Unplug vents as necessary.

Check steam traps with a digital thermometer or listening device to detect any steam escaping from the radiators through the condensate return. Replace leaking steam traps or their thermostatic elements. Repair leaks on the steam supply piping and on the condensate return piping.

All exposed steam piping in conditioned and unconditioned areas must be insulated with pipe wrap rated for steam pipes.

Domestic Hot Water Systems

All water heaters must have a pressure and temperature relief valve and a safety discharge pipe. Install a relief valve and discharge pipe if none exists. The pipe must terminate 6 inches above the floor and be made of copper or high temperature plastic.

Water heater insulation wraps shall not cover the top of oil or gas systems, and shall not obstruct the pressure relief valve, thermostats, hi-limit switch, plumbing pipes, or access plates. A minimum 2-inch clearance is required from the access door for gas burners.

Water heater insulation wraps shall not be installed where forbidden by the manufacturer's instructions found on the nameplate.

Use the following checklist as a guide for prioritizing duct sealing installations:

- ✓ Seal the largest leaks first. These include: disconnected ducts, missing end-caps, and other catastrophic holes
- ✓ Seal the areas of highest pressure. These included all the connections near the air-handler cabinet and supply and return plenums, flexible canvas plenum connectors, and filter slot covers.
- ✓ Seal all accessible connections between duct sections, at branches, and where take-offs connect to main trunk lines.
- ✓ Seal take-off connections to register boots and boot connections to floors, walls, and ceilings.

Sheet metal and flexible ductwork shall be sealed at all duct connections using duct mastic or similar product designed for sealing ducts. Duct tape is not an allowable duct sealing material. Aluminum FSK tape may be used on ductboard systems and at the connections to the air handler cabinet.

Filter slots must be tightly covered and the cover must be easily removed for cleaning and/or replacement. The homeowner should be instructed to replace the filter at every month for oil systems and every three months for heat pumps and gas systems.

Boilers and Hydronic Distribution

All systems must have an appropriate pressure relief valve, an operating pressure gauge, and a high temperature aquastat.

All water leaks must be identified and repaired.

All systems must have an operating control that will disable the gas valve when the high water temperature setting has been reached.

Open expansion tanks must be replaced with sealed and pressurized expansion tanks.

An effective air-excluding device must be installed as part of any new hydronic system.

All heating supply pipes in unconditioned areas must be insulated with closed-cell foam or fiberglass pipe insulation.

Thermostatic radiator valves may be used to balance temperatures from room to room, but cannot be installed on series loop systems.

Furnaces and Forced Air Distribution

Forced warm air furnaces must be inspected for flame interference. Visually inspect the burner as the blower fan comes on. If the flames burn differently when the blower comes on, a complete analysis needs to be done to find the source of the flame interference. This problem must be referred to a heating contractor. A cracked heat exchanger cannot effectively be repaired and must be replaced.

Heating system airflow shall be measured before and after work is performed on the system or its ductwork. Forced air furnaces must be tested using a heat rise measurement.

Forced air furnace airflow must be within manufacturer's specifications. Where the rated temperature rise range is not indicated on the furnace nameplate, ensure the measured temperature rise is within 40-70 degrees F.

If the heat rise on a forced air furnace is higher than manufacturer's specifications, repairs must be completed to increase the airflow. Measures may include: cleaning of filters or removing blockages in the ductwork, adding returns, and increasing the fan speed.

If the heat rise is lower than the manufacturer's specifications and the customer has indicated concerns of uncomfortable conditions in the home, check the fan speed and the fan on temperature. If these settings are correct, examine and adjust the gas input to increase the temperature rise to the specified range, then re-measure for CO.
The fan off temperature must be set as close to 90 degree F as possible.

The fan on temperature must be set as close to the fan off temperature as possible (usually 120-130 degrees F), but the fan on delay may be no shorter than 20 seconds after the gas valve is energized.

If the limit switch setting is low enough to cause cycling during a 5-minute test, the switch can be reset, but never above 275 degrees F.

When quantifying duct leakage, an appropriate type of measurement system shall be used, which includes a metered and calibrated duct pressurization device. Pre and post-installation duct leakage shall be measured any time that duct sealing is part of the work scope to verify the success of the installation.

Duct leakage areas must be diagnosed using appropriate duct leakage testing equipment and/or pressure pan tests to prioritize leakage areas (treating the largest leaks and the highest pressure areas first) anytime duct sealing is installed.

No significant carbon buildup should be visible anywhere in the unit. This includes the draft hood, heat exchanger, and burners. If carbon is present, it must be totally removed and the source of the combustion problems must be determined and remedied before proceeding.

The burner flames must be directly inspected to ensure that all burners are operating properly. The flames should be consistent with the burner design. All sections of the burner should be ignited properly with no irregularities in the flame, ghosting, or white tips on the flames. If the flames are not firing properly, the burner jets must be cleaned.

Thermostat anticipator settings must be adjusted, as needed, to match the amperage measured in the control circuit or to meet the thermostat manufacturer's specifications.

Oil Systems

Fuel oil supplied to a combustion appliance must be free of water and other contaminants. In cold climates, steps shall be taken to ensure continuous flow and to avoid freeze ups.

Fuel oil storage system integrity must be checked and appropriate necessary repairs included in the work scope.

When a new oil heating system is installed, the oil filter must be replaced and deposits at the bottom of the tank must be removed. Tank and oil lines must be in compliance with NFPA 31.

All oil-fired heating systems must be equipped with a barometric draft control, except for systems with high-static pressure burners or mobile home units.

CAD cell or stack control activation must be timed to verify that the burner will shut off if the fuel is not ignited.

Where burner and nozzle replacements are installed, the assembly must be sized according to actual building heat load calculations. Oil systems may be downsized by replacing the nozzle using the following criteria:

- With cast iron head burners, the firing rate may not be reduced below the manufacturer's rating. (Check the nameplate for acceptable firing rates.)
- With flame retention head burners, the flue gas exit temperature must not go below 325 degrees F.

Where CAZ depressurization is a problem, a high static pressure retention head may be installed as an alternative to providing make-up air to the system as long as no other combustion appliances exist in the CAZ.

For use in savings calculations and system sizing, seasonal efficiency must be calculated and applied. To determine the seasonal efficiency, first obtain the rated AFUE for the system. (AFUE ratings may be found in the GAMA listing.) Associate an efficiency to the distribution system using the chart below. The seasonal efficiency is equal to the AFUE multiplied by the distribution efficiency.

Distribution Efficiency Look-up Table

Distribution Type	Condition	Efficiency
Forced Air	✓ System is 90% or more inside the building envelope ✓ Connections have been effectively sealed with mastic or other permanent duct sealant ✓ Ducts located outside the building envelope are insulated to a minimum R-10	90-95%
	✓ System is more than 50% inside the building envelope ✓ No significant leaks ✓ Ducts located outside the building envelope are insulated to a minimum R-7	80-90%
	✓ System is 50% or more outside the building envelope ✓ Some observable duct leaks ✓ Ducts located outside the building envelope are insulated to a minimum R-5	70-80%
	✓ System is more than 50% outside the building envelope ✓ Significant observable duct leaks ✓ Ducts are uninsulated, or insulation is less than R-5	60-70%
Forced Hot Water or Steam	✓ System is 90% or more inside the building envelope ✓ Pipes are insulated to a minimum R-6	90-95% (hw) 80-90% (s)
	✓ System is more than 50% inside the building envelope ✓ Pipes are insulated to a minimum R-6	85-90% (hw) 70-80% (s)
	✓ System is more than 50% inside the building envelope ✓ Pipes are uninsulated, or insulation is less than R-6	80-90% (hw) 60-70% (s)
	✓ System is more than 50% outside the building ✓ Pipes are uninsulated, or insulation is less than R-6	70-80% (hw) 50-60% (s)

Gas Systems

The entire gas line must be examined and all leaks repaired. Particular care should be made in the immediate vicinity of the appliances and at the joints, shutoff valves, and pilot lines. Identify leaks using a gas leak detector and accurately locate the source of the leak using a soap bubble solution.

Flexible gas lines must be replaced if they are: kinked, corroded or show signs of visible wear, the line was manufactured before 1973 (date is stamped on the date ring attached to the line), or the line has any soldered connections.

the chimney meets appropriate NFPA requirements under the new condition and the water heater has been test and passed all required combustion safety tests (spillage, draft, CAZ depressurization).

Domestic hot water heater replacements shall be sized according to the guidelines established by the Gas Appliance Manufacturer's Association (GAMA). The first hour rating for new systems shall match the calculated peak hour demand within 1-2 gallons. When installing new water heating systems or retrofitting existing systems, measures to reduce the peak demand should be recommended as part of the work scope.

Heating System Inspections

A combustion gas analysis is required on oil-fired and gas-fired furnaces and boilers, any time replacement or repair is not part of the intended work scope. Appropriate repairs shall be completed as part of the work scope any time the results of this analysis are outside the acceptable ranges identified in the Acceptable Combustion Test Analysis Table.

Acceptable Combustion Analysis Measurements

	Heating Unit Type	Oxygen	Carbon Dioxide	Net Stack Temperature	Smoke Test	Carbon Monoxide
Natural Gas or Propane	Atmospheric	4-9%	8-12%	300-600 degrees F	N/A	100 ppm
	Fan Assisted	4-9%	8-12%	300-480 degrees F	N/A	100 ppm
	Condensing	PMI	PMI	PMI	N/A	100 ppm
	Standard Power Burner	4-9%	8-12%	275-550 degrees F	N/A	100 ppm
Oil	Standard Burner	4-9%	8-10%	325-600 degrees F	1 or less	100 ppm
	Flame Retention	4-7%	8-10%	325-600 degrees F	1 or less	100 ppm
	Condensing	PMI	PMI	PMI	1 or less	100 ppm

PMI = Per Manufacturer's Instructions

A complete clean and tune of the heating system shall be conducted whenever:

- Combustion gas analysis results are outside the acceptable ranges identified in the chart show above.
- The system shows signs of neglect or the customer indicates it has not been serviced within 1 year for oil systems or 2 years for gas systems.
- Safety diagnostics indicate a problem.
- Airflow diagnostics indicate incorrect flow that is not readily correctable.

Replacement and New Installations

New installations of heating systems must be designed and sized based on actual heating load calculations for the building. Acceptable sizing calculation methods include ACCA Manual J and Manual S, IBR load calculations, or other comparable calculation procedures. Replacement systems may not be sized larger than the existing system without providing a load calculation verifying the need for a larger system. Gas and electrically fueled heating systems must be sized within 25% of calculated design loads. Oil fueled heating systems must use the smallest available burner size which will meet the calculated heating load for the building.

It is recommended that blower door test results are used to determine the building air leakage rates input into load calculations.

New installations of hydronic distribution systems shall be designed based on actual calculated Btu loads for the space being conditioned utilizing Manual J or comparable calculation methodology. Radiator size must be within 20% of calculated loads for the space being conditioned.

New installations of ducted distribution systems shall be designed to provide the appropriate airflow based on actual calculated Btu loads for the space being conditioned using Manual J or comparable calculation methodology. Duct systems shall incorporate provisions for friction losses in the design, and shall provide for balanced supply and return airflows in each zone of the building. After installation, register airflows must be measured and verified to deliver airflows that are within 20% of design airflows. Deviations from design criteria greater than 20% must be corrected.

New installations of ducted distribution systems must be tested for leakage using a duct leakage testing device and duct tightness must meet or exceed the requirements set forth in the EPA standards for Energy Star Ducts. The sum of the supply and return leakage to outside, measured in cfm25, divided by the fan flow shall be no more than 10%. (Example: Assuming 1200 cfm system airflow, the leakage to outside shall be no greater than 120 cfm25.)

When atmospherically vented combustion appliances are replaced with sealed combustion units, an exhaust appliance has been removed from the home. To ensure that the building will have adequate air exchange after this retrofit, a blower door test must be completed and mechanical ventilation installed as needed to provide ventilation levels compliant with ASHRAE Standard 62-89. This procedure must be followed even if no alterations to the building shell are anticipated as part of the work scope.

When a high efficiency appliance, such as a furnace, is installed and no longer requires chimney venting, "orphaned" water heaters must be tested for safe operation. Water heaters may not be left venting alone into a previously shared chimney without ensuring

higher than 25 ppm, but in no case should the level be higher than 100 ppm without servicing the system to reduce its CO production. If CO levels exceed 100 ppm and the appliance spills under natural conditions, the problem must be repaired before proceeding with other measures.

A thorough inspection of the fuel supply for both oil and gas must be conducted to ensure the system is leak free. Leaks that are found must be repaired prior to proceeding with work on the system.

The following are the minimum required health and safety diagnostics and specifications for Heating Specialist level certification. Minimum health and safety requirements apply to all jobs with work related to energy efficiency and/or indoor air quality performed by BPI accredited firms.

Minimum Health and Safety Requirements
(Technician II: Heating Specialist)

(refer to main text and the Technician I Standards for detailed descriptions and applications of the standards below)

- Combustion appliances which fail any combustion safety test, as described in the Technician I Standards, must be adjusted, repaired, or replaced; and the problem effectively remedied before proceeding with additional installations.
- When atmospherically vented combustion appliances are removed or replaced with sealed combustion units, a blower door test must be done to verify adequate air exchange across the building shell. Mechanical ventilation must be added, as needed to provide adequate air exchange in compliance with ASHRAE 62-89.
- When a high efficiency appliance, such as a furnace, is installed and no longer requires chimney venting, "orphaned" water heaters must be tested and verified for safe operation.
- In homes with natural gas service, the gas line must be inspected thoroughly and all leaks repaired.
- Forced warm air furnaces must be inspected for flame interference and additional heat exchanger integrity tests must be performed as indicated by the flame interference inspection. Cracked heat exchangers must be replaced.
- Steam distribution system pipes must be insulated in all accessible locations.
- All water heaters must have a pressure and temperature relief valve and a safety discharge pipe. Install a relief valve and discharge pipe if none exists.

Building Performance Institute
Technical Standards
For Certified Heating Specialists
(Technician II)

Health and Safety

Personal Safety

All technicians performing diagnostics, inspections, or installations, must have access to all necessary personal safety equipment required by OSHA. Technicians must be trained in proper use and applications for these devices and must adhere to OSHA regulations when on the job site.

All hand tools, power tools, and diagnostic equipment must be handled and used in a safe manner and kept in good working condition. Equipment and diagnostic tools must be maintained and calibrated according to manufacturer's specifications.

A copy of the Material Safety Data Sheets (MSDS) for all materials used on the job and installed in the home, must be kept on each crew vehicle and made available to all workers and clients upon request.

Where asbestos or lead and/or other hazardous material is suspected, all relevant state and federal (EPA) guidelines must be followed to ensure technician and occupant safety.

Respirators with filter cartridges must be worn when working in areas where exposure to airborne mold, asbestos, lead, fiberglass, or formaldehyde is a risk.

Electrical power must be shut off before working on mechanical equipment.

Occupant Safety

A deteriorated chimney must be repaired or relined and the cause corrected before reusing according to the following standards: NFPA 31 for oil fired units, NFPA 54 for gas fired units, NFPA 211 for solid fuel units.

Measured carbon monoxide levels of undiluted flue gases in combustion appliances should be below 25 ppm. Appliances with multiple burners may have multiple ports and CO must be measured in each one. Efforts should be made to lower the CO level if it is

being installed. Single-walled flue pipes require a minimum 6" clearance to insulation or other combustible materials.

Where soffit vents are present, and access is viable, appropriate blocking or baffles are required to provide protection from wind-washing where insulation exists.

Batt insulation shall be installed at full loft with the insulation in full contact with the warm building surface. Gaps between the insulation and the building elements must be avoided. Insulation batts shall not be folded, tucked, rolled, or otherwise compromised when installed for insulation purposes.

Insulation installed in kneewalls or other exposed vertical areas must be covered on the cold side with an air barrier such as plywood or housewrap to protect the insulation from wind-washing and free convection within the insulation. This measure is not necessary if foam insulation is used.

Blown insulation shall be installed at appropriate air pressure and material quantity to ensure complete coverage and manufacturer's recommended density to achieve the prescribed R-value without voids, gaps, or settling in enclosed cavities.

All attic access openings, including doors, hatches, and pull-down stairs shall have a tightly fitting cover which is insulated to a minimum R-14.

Windows

Windows shall be installed according to manufacturer's instructions to assure proper operation and moisture protection. Rough openings shall be sealed to be air tight prior to installation of casings and sills. Newly installed windows shall be inspected and verified for proper operation of all hardware and locking mechanisms.

When quantifying duct leakage, an appropriate type of measurement system shall be used, which includes a metered and calibrated duct pressurization device. Pre and post-installation duct leakage shall be measured any time that duct sealing is part of the work scope to verify the success of the installation.

Duct leakage areas must be diagnosed using appropriate duct leakage testing equipment and/or pressure pan tests to prioritize leakage areas (treating the largest leaks and the highest pressure areas first) anytime duct sealing is installed.

Use the following checklist as a guide for prioritizing duct sealing installations:

- ✓ Seal the largest leaks first. These include: disconnected ducts, missing end-caps, and other catastrophic holes
- ✓ Seal the areas of highest pressure. These included all the connections near the air-handler cabinet and supply and return plenums, flexible canvas plenum connectors, and filter slot covers.
- ✓ Seal all accessible connections between duct sections, at branches, and where take-offs connect to main trunk lines.
- ✓ Seal take-off connections to register boots and boot connections to floors, walls, and ceilings.

Sheet metal and flexible ductwork shall be sealed at all duct connections using duct mastic or similar product designed for sealing ducts. Duct tape is not an allowable duct sealing material. Aluminum FSK tape may be used on ductboard systems and at the connections to the air handler cabinet.

Insulation

Prior to installing insulation in an existing home, a thorough inspection of the interior and exterior of the home is required to identify areas where installation of insulation may be unsafe. Problem areas include: areas with knob and tube wiring, recessed light fixtures, areas where moisture is present or suspected, and structurally unsound building elements (suspended tile ceilings, wood paneling, etc.) Problems that are identified must be remedied prior to insulating.

Insulation may not be installed in areas of homes where live knob and tube wiring exists.

Attic insulation may not be installed without first verifying the presence of an effective air barrier between the attic and living space via visual inspection and pressure differential testing as identified in the standards for air sealing listed above.

Attic ventilation may not be installed without first verifying the presence of an effective air barrier and thermal barrier between the attic and the living space. Refer to local codes for minimum required insulation levels.

Recessed can light fixtures that are not IC rated and chimneys must be baffled with an effective dam prior to insulating to maintain a minimum 3" clearance to the insulation